

## REMARKS

This Amendment is respectfully submitted to place rejected claims of subject Application in condition for allowance. Claims 2, 5 to 8, and 10 to 11 inclusive have been canceled without prejudice.  
5 The Claims 1 and 35 have been amended to more clearly point out the patentable subject matter of Applicants novel invention.

Claim 1 has been amended in response to Examiner Nguyen position that it is unclear if 0.1 or 50% of cobalt (as previously recited in Claim 1) would give similar results a 8% of cobalt used in  
10 Runs 38 to 55, which were carried out in accordance with Applicants' novel process. Advantageously, Applicants' process uses a preselected solid oxidation catalyst comprising a cobalt containing component present in the oxidation catalyst in an amount ranging from 2 to 20 percent by weight and a basic support  
15 comprising a member of the group consisting of calcium oxide and magnesium oxide.

In particular, Claim 1 has been amended to recite the critical steps of Applicants' novel process, which are:  
contacting said feedstock with an oxygen-containing gas  
20 in an oxidation zone at oxidation conditions comprising elevated temperatures in a range from about 200 degrees F to about 450 degrees F in the presence of solid oxidation catalyst comprising a cobalt containing component in an amount ranging from 2 to 20 percent  
25 by weight based on the total weight of the catalyst and a basic support comprising a member of the group consisting of calcium oxide and magnesium oxide, and recovering an effluent stream distillate having an oxygen content incorporated therein in a range of 0.2 to 20  
30 percent by weight and a TAN number of less than 2 mg KOH/g.

Support for amended Claim 1 is found in the Specification, for example at page 5, lines 26 to 28, page 7, lines 9 and 10, and lines 26 to 28, and canceled Claims 2, 5 to 8 and 10 to 12.

Claim 35 has been amended to recite the critical steps of  
5 Applicants' novel process, which are:

contacting said feedstock with an oxygen-containing gas  
in an oxidation zone at oxidation conditions comprising  
elevated temperatures in a range from about 250  
degrees F to about 350 degrees F in the presence of  
10 solid oxidation catalyst comprising cobalt in an amount  
ranging from 4 to 12 percent by weight based on the  
total weight of the catalyst and magnesium oxide, and  
recovering an effluent stream distillate having an oxygen  
content incorporated therein of about 1.8 to about 10  
15 percent by weight and a TAN number less than about  
1 mg KOH/g

Support for amended Claim 34 is found in the Specification,  
for example at page 5, lines 26 to 28, and canceled Claim 6.

It is the position of Applicants that instant Claims 1, 3, 4 and  
20 35 are now commensurate in scope with the evidence presented in  
the specification which shows the advantage of applicants' novel  
process.

#### Claim Objections

Responsive to the identification by Examiner Nguyen of a  
25 typographical error in Claim 1, the term "Group VII" has been  
replaced with --cobalt containing--.

#### Claim Rejections - 35 U.S.C. § 103(a)

In outstanding Office Action, Claims 1 to 8, 10, 11, and 34  
were rejected under 35 U.S.C. § 103(a) as being unpatentable over

European Patent Application 0 525 606 (Brownawell et al.) in view of US Patent No. 5,637,259 in the name of Jan Z. Galuszka, Safaa Fouda, Raj N. Pandel and Shamsuddin Ahmed (Galuszka et al.). Applicants respectfully traverse these rejections.

5       The Brownawell et al. reference of record describes the term "catalyst" as an oil or water soluble or insoluble compound, other than an oxide, of one or more catalytic metals selected from a listing of 29 known elements. As noted by Examiner Nguyen, this long listing included cobalt. Where the metallic compound is  
10 insoluble in both oil and water, the non-oxide metal compound may be supported on a "suitable" support material. However, no suitable support material is described. Rather, Brownawell et al. teaches that the preferred catalyst is one or more oil or water soluble compounds. (See page 5, lines 9 to 29)

15       In all of their working examples, only one such catalyst, an aqueous solution of copper sulfate pentahydrate, is used to demonstrate the Brownawell et al. process. However, their oxidized products contained high levels of sulfur (4,200 ppm and 1,000 ppm) which levels are well above the requirements for Diesel  
20 fuels today.

By contrast, a distillate feedstock is selectively oxygenating according to Applicants' novel process in the presence of solid oxidation catalyst comprising a cobalt on a basic support (calcium oxide and magnesium oxide), and recovering an effluent stream  
25 distillate having an oxygen content incorporated therein in a range of 0.2 to 20 percent by weight and a TAN number of less than 2 mg KOH/g.

The Galuszka et al. references of record describes a process for producing syngas and hydrogen from natural gas using a  
30 membrane reactor. This reference states that a variety of known catalysts containing various metals, such as iron, cobalt, nickel,

ruthenium, rhodium, palladium, iridium, platinum, cerium etc., may be used for the process of invention. The metal is usually supported and a large variety of supports may be used, such as alumina, silica, magnesia, zirconia, yttria, calcium oxide, zinc  
5 oxide, perovskites, lanthanide oxides, etc., e.g. as described in Tsang et al., Catalysis Today, 23, 3, (1995).

According to Galuszka et al., supported palladium catalysts (wherein the support is  $\alpha$  Al<sub>2</sub> O<sub>3</sub>,  $\gamma$  Al<sub>2</sub> O<sub>3</sub>, SiO<sub>2</sub> and ZrO<sub>2</sub> ) are used for the partial oxidation of methane to syngas fuel  
10 intermediate in a conventional reactor, i.e. oxidation of gaseous methane to gaseous products.

It is the position of Applicants that the combination of the Brownawell et al. alone or in combination with the Galuszka et al. as relied upon by Examiner, does not suggest Applicants' novel  
15 process as recited in instant claims.

Attention of Examiner is invited to inspect FIGURE 1 which summarizes oxygenation of 25 ppm sulfur diesel according to Applicants' novel process for catalyst cobalt loadings from about 2 to about 20 percent by weight. Oxygen levels in the oxygenated  
20 diesel range upward from about 1.8 mg KOH/g.

The critical nature of the catalyst support for control of TAN is illustrated in FIGURE 3 for catalyst cobalt loading of 8 percent by weight. TAN levels ranged upward from about 2 mg KOH/g for the Mg silicate, clay, ZnO, alumina and SnO<sub>2</sub> supports. By  
25 contrast, TAN levels for cobalt on MgO and CaO supports ranged downward from about 1.5 mg KOH/g.

Run No. 42 and Run No. 43 in Table II at page 14 in the Specification which demonstrated the efficacy of Applicants' novel invention to achieve oxygen levels above 1.8 percent by weight, in

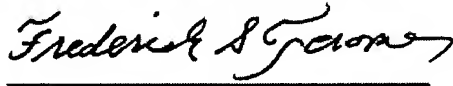
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fact above 2, while controlling TAN numbers to unexpected low levels less than 1 mg KOH/g.

Base on the amendments submitted herein, Applicants urge that Claims 1, 3, 4, and 35, all claims now presented, are in  
5 condition for allowance. Applicants respectfully request Examiner Nguyen to pass subject application for allowance.

Do not hesitate to contact Frederick S. Jerome whose telephone number is (630) 832-7974 (FAX (630) 832-7976) if additional assistance is needed regarding this paper or earlier  
10 papers for Applicants.

Applicants and their undersigned Attorney appreciate Examiner's attention and further consideration of this matter.

15 Respectfully submitted,  
  
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